Summary of human isolates reported to *Vibrio* Surveillance System, 2000

Background

Since 1988, CDC has maintained a voluntary surveillance system for *Vibrio* isolates from humans in the Gulf Coast states (Alabama, Florida, Louisiana, Mississippi and Texas). The objective of the surveillance system is to obtain reliable information on illnesses that yield *Vibrio* strains. Participating health officials collect clinical data, information about underlying illness, history of seafood consumption and exposure to seawater in the seven days before illness, and conduct tracebacks of implicated oysters. Information from the surveillance system has been used to educate consumers and to help determine host, food, and environmental risk factors.

In recent years, *Vibrio* surveillance has expanded to include any state with a human *Vibrio* isolate (Figure 1). However, states are not required to submit reports of *Vibrio* isolates and the true number of *Vibrio* isolates may be greater than reported. CDC serotypes all *V. parahaemolyticus* received from state health departments.

This report summarizes human *Vibrio* isolates reported to CDC through the *Vibrio* Surveillance System in 2000. Results are presented in two categories: *V. cholerae* isolates that produce cholera toxin (referred to as *Vibrio cholerae*-CT^+), and all other *Vibrio* isolates (excluding *V. cholerae*-CT^+), including those *V. cholerae* isolates that did not produce cholera toxin. Results are presented separately for Gulf Coast states versus other states to be consistent with previous reports. Additionally, results are presented by anatomic site of isolation. It is important to note that isolation of *Vibrio* from a patient with illness does not necessarily indicate causation.

Isolates of *Vibrio cholerae*-CT^+

In 2000, *V. cholerae* O1 CT^+ was identified from four patients in two states (Table 1). One patient acquired the infection in Micronesia, while the other three were domestically acquired. Two of the three patients with domestically-acquired infection most likely acquired their infection through the consumption of seafood, while the suspected vehicle for the other patient remains unknown. All patients had diarrhea, two were hospitalized, and none died. An additional four isolates of *V. cholerae* O1 CT^+ were reported from Guam, which is not included in the surveillance system.

Other *Vibrio* isolates (excluding *V. cholerae*-CT+)

This section describes the other 296 *Vibrio* isolates and associated illnesses reported to the *Vibrio* Surveillance System in 2000; data from the four patients with cholera is excluded. These 296 isolates included 122 from Gulf Coast states (Table 2), 124 from Pacific-coastal states (California, Hawaii, Oregon, and Washington), and 50 from 13 other states (Table 3). Among patients for whom information was available, 116 (44%) of 265 were hospitalized and 25 (9%) of 284 died. Although *V. parahaemolyticus* was the most frequently reported *Vibrio* species (46%), *V. vulnificus* was isolated from 22 (88%) of the 25 persons who died.

Geographic Location

V. parahaemolyticus accounted for a greater percentage of *Vibrio* isolates among non-Gulf Coast states than Gulf Coast states (60% versus 27%). The proportion of *V. parahaemolyticus* isolates from stool was much higher from patients from non-Gulf Coast states than Gulf Coast states (90% versus 58%). However, a greater proportion of patients with *V. parahaemolyticus* from Gulf Coast states were hospitalized (47% versus 14%). There were no other major geographic differences in the rates of hospitalization or site of isolation for other species, including *V. vulnificus*.

Anatomic Site of Isolation

Among the 296 *Vibrio* isolates from all states, 268 (91%) were from one of three sources: stool (52%), wound (20%), or blood (18%). In addition, 14 (5%) isolates were obtained from the ear, and 14 (5%) were from the eye, gallbladder, urine, or an unrecorded source. Among patients from whom a single species was identified, *V. parahaemolyticus* accounted for 137 (48%) of the 287 isolates, including 114 (72%) of 158 from stool. *V. vulnificus* was isolated from 64 (22%) of these 287 patients, but accounted for only two (1%) of 158 stool isolates. Among the 71 wound infections with a single species identified, the most common isolate was *V. vulnificus* (n=20, 33%), followed by *V. parahaemolyticus* (n=17, 28%) and *V. alginolyticus* (n=16, 26%).

Seasonality

The number of patients from whom *Vibrio* species was isolated had a clear seasonal peak during the summer months (Figure 2). The greatest number occurred in June for Gulf Coast states and in August for non-Gulf Coast states.

Exposures

Among 185 persons with *Vibrio* isolated from stool or blood, for whom food history was available, 99% consumed seafood in the 7 days before illness onset. Among the 66 who reported eating a single seafood item, 56% ate oysters, including 37% who ate raw oysters, 20% ate shrimp, 12% ate fish, and 12% ate either clams, crab, or lobster.

Laboratory

In 97 (52%) of 186 *Vibrio* isolates for which this information is known, the state public health laboratory confirmed the submitting laboratory's identification. Isolates of *V. parahaemolyticus* from 24 patients in seven states (CA, CT, GA, MD, MN, OR, and TX) were submitted to CDC for serotyping. Of the 24 patients, seven (29%) had serotype O4:K12, 5 (21%) had serotype O3:K6, and the remaining 12 patients had 10 other serotypes.

Table 1: Isolates of *V. cholerae*-CT^{+}, 2000 (N=4)

State	Age	Sex	Onset	Suspected Exposure	Isolate
LA	61	M	04/22/00	Seafood	*V. cholerae* O1 CT^{+}
LA	23	M	04/23/00	Seafood	*V. cholerae* O1 CT^{+}
LA	45	F	06/18/00	Unknown	*V. cholerae* O1 CT^{+}
MN	30	M	07/21/00	Exposure in Micronesia	*V. cholerae* O1[1] CT^{+}

[1] Resistant to furazolidone, sulfisoxazole, and streptomycin.

Table 2. *Vibrio* isolates (excluding *V. cholerae*-CT+) from Gulf Coast States, 2000 (N=122)

Vibrio Species	Patients	Site of Isolation				Complications	
		Stool	Blood	Wound	Other [1]	Hospitalized [2]	Deaths [2]
	n (%)					n/N (%)	n/N (%)
V. alginolyticus	18 (15)	1	1	11	5	6/18 (33)	0/18
V. cholerae[3]	14 (11) [4]	9	5	1	2	8/13 (62)	0/13
V. damsela	1 (1)	0	0	1	0	0/1 (0)	0/1
V. fluvialis	4 (3)	4	0	0	0	2/4 (50)	0/4
V. hollisae	3 (2)	3	0	0	0	1/3 (33)	0/3
V. metschnikovii	1 (1)	0	1	0	0	1/1 (100)	0/1
V. mimicus	3 (2)	3	0	0	0	0/3 (0)	0/3
V. parahaemolyticus	33 (27)	19	1	12	1	14/30 (47)	0/31
V. vulnificus	39 (32) [5]	2	23	16	1	35/35 (100)	10/37 (27)
Species not identified	4 (3)	2	0	2	0	0/4 (0)	0/4
Multiple species	2 (2)	0	1	1	0	1/2 (50)	1/2 (50)
Total	**122 (100)[4,5]**	**43**	**32**	**44**	**9**	**68/114 (60)**	**11/116 (9)**

[1] Includes ear, peritoneal fluid, urine, and unknown source.
[2] Denominators indicate patients for whom information is known.
[3] Excluding *V. cholerae*-CT+. Includes *V. cholerae* non-O1 non-O139 (13 isolates), and *V. cholerae* O1-CT$^-$ (1 isolate).
[4] *Vibrio cholerae* was isolated stool and blood for three patients.
[5] *Vibrio parahaemolyticus* was isolated from blood and another site for three patients.

Table 3. *Vibrio* isolates (excluding *V. cholerae*-CT+) from non-Gulf Coast States, 2000 (N=174)

Vibrio Species	Patients	Site of Isolation				Complications	
		Stool	Blood	Wound	Other [1]	Hospitalized [2]	Deaths [2]
	n (%)					n/N (%)	n/N (%)
V. alginolyticus	12 (7)	0	0	5	7	2/10 (20)	0/12
V. cholerae[3]	13 (7)	8	2	2	1	7/11 (64)	1/12 (8)
V. fluvialis	10 (6)	9	0	0	1	3/8 (38)	0/9
V. hollisae	4 (2)	3	0	1	0	2/3 (67)	0/4
V. mimicus	3 (2)	1	0	0	2	0/2 (0)	0/3
V. parahaemolyticus	104 (60)	94	2	5	3	13/95 (14)	1/102 (1)
V. vulnificus	25 (14)[4]	0	19	6	2	21/22 (95)	12/22 (55)
Species not identified	3 (2)	1	0	0	2	0/2 (0)	0/3
Total	**174 (100) [4]**	**116**	**23**	**19**	**18**	**48/151 (32)**	**14/166 (8)**

[1] Includes ear, peritoneal fluid, urine, and unknown source.
[2] Denominators indicate patients for whom information is known.
[3] Excluding *V. cholerae*-CT+. Includes *V. cholerae* non-O1 non-O139 (12 isolates), and *V. cholerae* O1-CT$^-$ (1 isolate).
[4] *Vibrio vulnificus* was isolated from blood and wound for two patients.

Figure 1. States that reported *Vibrio* isolates, 2000 (N=300 isolates)

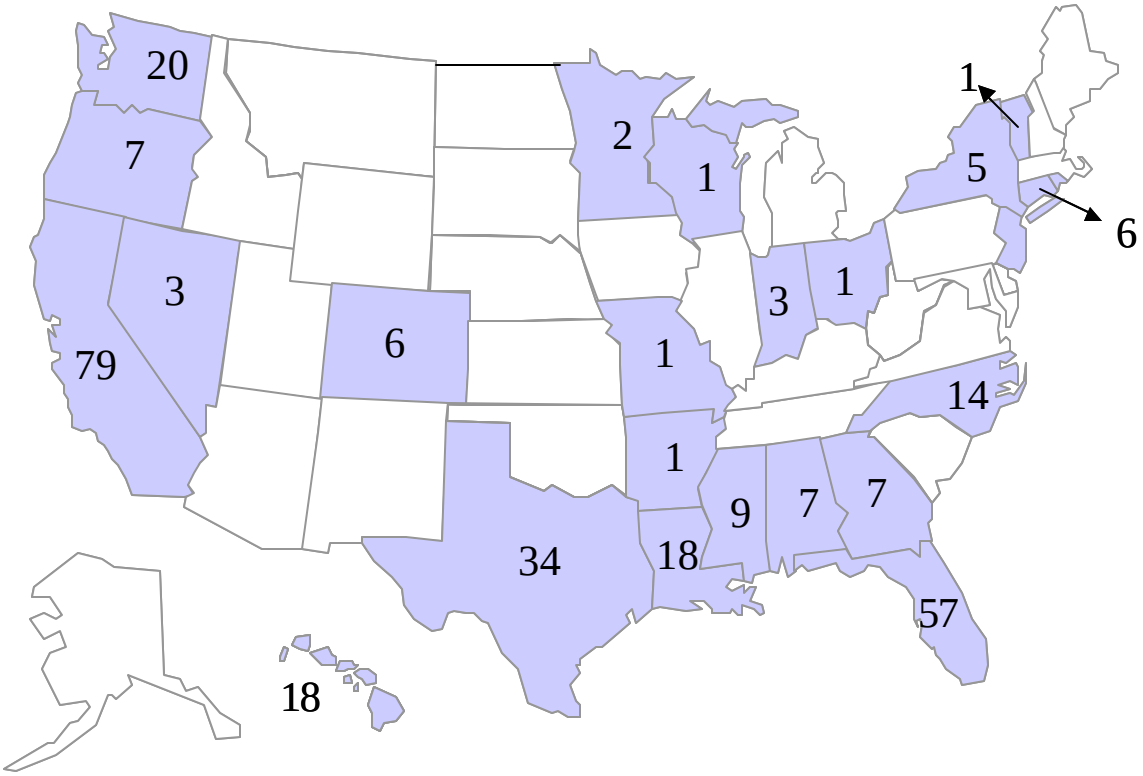

Figure 2. Seasonality of *Vibrio* isolates (excluding *V. cholerae*-CT^{+}) from ill persons, Gulf Coast states vs. other states, 2000